

WHAT IS CLAIMED IS

1 1. A power supply, comprising:
2 an input receiving an input voltage;
3 a selectively actuated boost converter coupled to the input and operable to
4 selectively boost the input voltage; and
5 a forward converter operable to convert the input voltage to a plurality of
6 regulated output voltages.

1 2. The power supply of claim 1 wherein the selectively actuated boost converter
2 includes means for comparing the input voltage to a reference voltage and boosting the input
3 voltage above the reference voltage when the input voltage is less than the reference voltage.

1 3. The power supply of claim 1 wherein the plurality of output voltages are cross-
2 regulated.

1 4. The power supply of claim 1 wherein the power supply produces the regulated
2 output voltages for the input voltage which has a greater than 6.5:1 input ratio.

1 5. The power supply of claim 4 wherein the power supply produces the regulated
2 output voltages across the input ratio with an efficiency in excess of about 75%.

1 6. The power supply of claim 1 wherein the forward converter provides ground
2 isolation between the input voltage and the plurality of output voltages.

1 7. The power supply of claim 1 wherein the forward converter includes a resonant
2 reset circuit.

1 8. The power supply of claim 1 wherein the forward converter utilizes a coupled
2 output inductor to produce the plurality of output voltages.

1 9. The power supply of claim 8 wherein the coupled output inductor is a trifilar
2 wound, interleaved transformer.

1 10. The power supply of claim 1 wherein the forward converter utilizes an isolation
2 transformer.

1 11. The power supply of claim 10 wherein the isolation transformer is a trifilar
2 wound, interleaved transformer.

1 12. The power supply of claim 1 further including, for each of the plurality of output
2 voltages, a low drop-out regulator for producing a corresponding regulated output voltage.

1 13. The power supply of claim 1 further including an input protection circuit coupled
2 to receive the input voltage and provide over-current, over-voltage and line drop out protection.

1 14. The power supply of claim 1 further including a linear regulator circuit couples to
2 receive the input voltage and provide a start-up bias voltage.

1 15. The power supply of claim 1 wherein the boost converter includes a circuit for
2 disabling boost operation in response to a sleep mode control signal.

1 16. The power supply of claim 15 further including, for each of the plurality of output
2 voltages, a low drop-out regulator for producing a corresponding regulated output, each low
3 drop-out regulator including a circuit for disabling the regulator in response to the sleep mode
4 control signal.

1 17. The power supply of claim 1 further including a supply status circuit that provides
2 a visual indication of power supply operational status.

1 18. The power supply of claim 17 wherein the visual indications include on, off and
2 in sleep mode.

1 19. A power supply circuit, comprising:
2 a voltage booster including:
3 a boost circuit to boost an input voltage to a boost voltage; and
4 a mode selector that activates the boost circuit if the input voltage is less
5 than a threshold voltage and deactivates the boost circuit if the input voltage is greater than the
6 threshold voltage; and
7 a multi-voltage output forward converter circuit that receives the input/boost
8 voltage and generates a plurality of DC output voltages therefrom.

1 20. The power supply circuit according to Claim 19, further including a low drop-out
2 voltage regulator circuit for each of the plurality of DC output voltages.

1 21. The power supply circuit according to Claim 19, wherein the multi-voltage output
2 forward converter circuit comprises:
3 a first transformer having a primary winding and a plurality of secondary
4 windings;
5 a second transformer having a plurality of windings corresponding to the plurality
6 of secondary windings, wherein the plurality of windings are coupled to the plurality of
7 secondary windings where the plurality of DC output voltages are generated.

1 22. The power supply circuit according to claim 21 wherein the plurality of windings
2 on the second transformer form a coupled output inductance.

1 23. The power supply circuit according to Claim 21, wherein the multi-voltage output
2 forward converter circuit further comprises:

3 a sensor to sense one of the plurality of DC output voltages;
4 a switching circuit coupled to the primary winding of the first transformer, the
5 switching circuit selectively actuated to draw energy through the primary winding of the first
6 transformer in response to the sensed output voltage.

1 24. The power supply circuit according to Claim 23, wherein the switching circuit
2 comprises:

3 a switching device connected in series with the primary winding of the first
4 transformer; and

5 a pulse width modulation control circuit generating a control signal for actuating
6 the switching device, the control signal having a variable duty cycle set responsive to the sensed
7 output voltage.

1 25. The power supply circuit according to claim 21 wherein the first and second
2 transformers have a trifilar wound interleaved design.

1 26. The power supply circuit according to claim 19 wherein the input voltage and at
2 least one of the plurality of DC output voltages are ground isolated.

1 27. The power supply circuit according to claim 19 wherein the forward converter
2 circuit includes a resonant reset functionality which obviates a need for a discrete snubber
3 circuit.

1 28. The power supply circuit according to claim 19 wherein the plurality of DC
2 output voltages are cross-regulated.

1 29. The power supply circuit according to claim 19 wherein the forward converter
2 circuit generates the plurality of DC output voltages at regulated levels across an input voltage
3 ratio of at least 6.5:1.

1 30. The power supply circuit according to claim 19 wherein the forward converter
2 circuit generates the plurality of DC output voltages at regulated levels across an input voltage
3 ratio of at least 10:1.

1 31. The power supply circuit according to claim 19 further including an input circuit
2 that smoothes the input voltage.

1 32. The power supply circuit according to Claim 31, wherein the input circuit
2 includes both inductive and capacitive elements.

1 33. The power supply circuit according to Claim 32, wherein the inductive and
2 capacitive elements are shared elements between the input circuit to smooth the input voltage
3 and the voltage booster to boost the input voltage to the boost voltage.

1 34. The power supply circuit according to Claim 19, wherein the boost circuit of the
2 voltage booster comprises a switching regulator for voltage step-up operation.

1 35. The power supply circuit according to Claim 34, wherein the switching regulator
2 is a pulse width modulated regulator.

1 36. The power supply circuit according to Claim 19, wherein the mode selector
2 implements a bypass operation to bypass the input voltage around the boost circuit when the
3 input voltage is greater than the threshold voltage.